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COOPERATIVE EXTENSION WORK IN AGRICULTURE AND HOME ECONOMICS.

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AND STATE AGRICULTURAL COLLEGES
COOPERATING.

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BOYS' AND GIRLS' CLUB WORK.

HOME CANNING INSTRUCTIONS.

METHODS AND DEVICES.

[This circular is a part of the series of follow-up instructions used in the home canning club work in the Northern and Western States, the complete series including NR-21, NR-22, NR-23, NR-24, NR-25, NR-26, NR-29, NR-30.]



FIG. 1.—Local club leader and his team of boy canning demonstrators uniformed in caps and khaki aprons.

The five methods of canning now in use are:

1. The open-kettle, or hot-pack method.
2. The intermittent, or fractional-sterilization method.
3. The cold-water method.
4. The vacuum-seal method.
5. The cold-pack, single-period method.

1. *Open-kettle, or hot-pack method.*—This is the oldest and most commonly used method. It requires the complete cooking of food products before packing or filling the cans and the final sealing. The packing is done after sterilization has been completed, hence there is



FIG. 2.—Home canning club member showing how she uses a common wash boiler for a canning outfit by simply providing a false bottom or blanching crate and cover cloth in order to make the cover tight and conserve heat.

always the possibility of spores and bacteria entering the jars before sealing. The method is suited to ordinary fruits, but not to vegetables, greens, sweet corn, and meats. Moreover, it is laborious and discourages canning in large quantities.

2. *Intermittent, or fractional-sterilization method.*—This is an efficient method of canning fruits, vegetables, and meats, as far as the handling and packing of the products are concerned, and it produces complete sterilization. It is not recommended for use in the Northern and Western States, because it does not encourage the saving of the large amount of inexpensive but important foods, such as greens, sweet corn, tomatoes, beets, and other home-grown products which are likely to go to waste if not canned by some effective single-period method. The

method is, however, laborious and requires a large amount of fuel, is time consuming, and usually overcooks the products.

3. *Cold-water method.*—This method should not be confused with the “cold-pack” method. The cold-water method is often used for canning rhubarb and green gooseberries and a comparatively few of the other sour berry fruits. It is not recommended for use in club home canning, for the reason that since most of the products so canned will need to be cooked before they can be used, it is a saving of both time and labor to do the necessary cooking while the product is being canned. If this method is used the product should be thoroughly washed, placed in a strainer, and scalding water poured over it; then packed at once in a practically fresh state in the jars, clean, cold water being added until the jars are filled. If the instructions are followed carefully and quickly, the method will be successful with a few such products as rhubarb and gooseberries.

4. *Vacuum-seal method.*—A development of importance to the home canning business is the introduction of specially made vacuum-seal jars. After the food product has been blanched, cold dipped, and cooked enough to make it ready for table use it can be packed in the jars and a vacuum produced. When the jars are perfectly made and the work properly done this method of canning may be successfully used by the average housewife or club member.

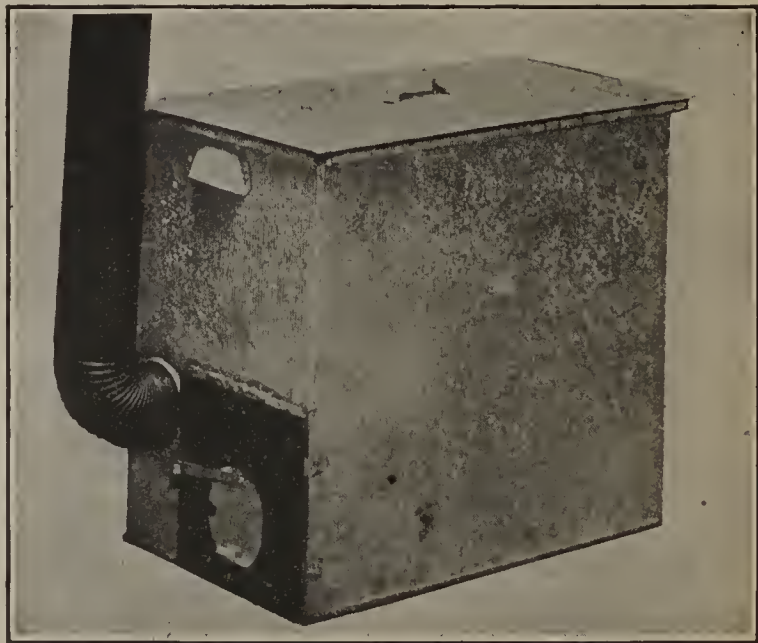


FIG. 3.—A hot-water bath type of commercial canner, showing fire box, sterilizing vat, smoke pipe, and cover.

5. *Cold-pack method*.—This is the method now in general use by the members of the home canning clubs as well as many adults in the Northern and Western States. In this method vegetables are blanched in boiling water or live steam, then quickly dipped into cold water, the skins removed, and the products cut into sizes for jars or packs. The products are then packed without further preparation in glass jars or other containers. Hot sirup is added in case of fruit, hot water and a little salt in case of vegetables and greens. Sterilization is done in the jar or container after it is partially or entirely sealed, making it impossible for bacteria or spores to enter the container after the product has been sterilized. By this cold-pack (or cold-fill) method of canning all food products, including fruits, vegetables, and meats, can be successfully sterilized in a single period, with but one handling of the product, in and out of the canner. The directions for the use of this method apply equally well to homemade outfits and to the five types of commercial canners. Practically every type of fruit jar manufactured can be successfully handled

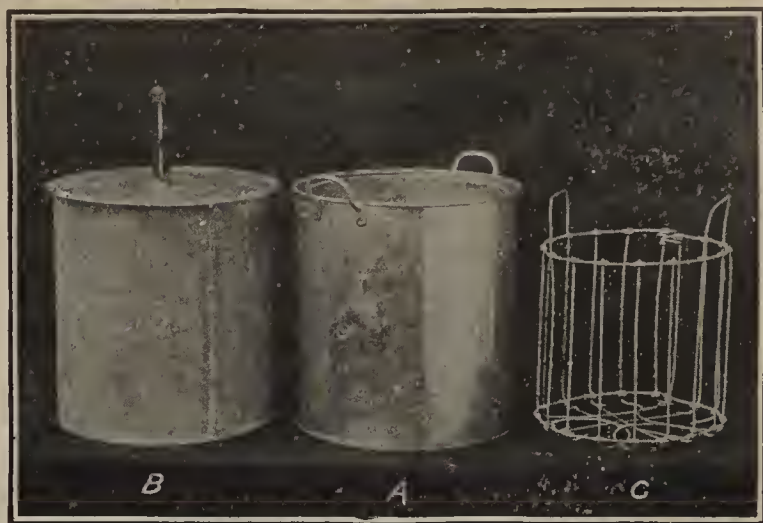


FIG. 4.—A type of water-seal canner: (A) Double-walled vat, (B) cover with thermometer, (C) crate for jars and cans.

by the method and many food products may be canned by one set of directions, thus avoiding the multiplicity of recipes required in other methods and greatly simplifying home canning.

CANNING EQUIPMENT.

The canning outfits in common use are of five general types:

1. *Homemade outfits* (fig. 2), such as wash boilers, tin pails, milk cans, washtubs, and lard pails. These are made especially convenient when provided with false bottoms, lifting handles, and tight-fitting covers.

2. *Hot-water bath commercial outfits* (fig. 3).—These are constructed usually for out-of-door work, and have a sterilizing vat, lifting trays, fire box, and smoke pipe, all combined in one piece. They are light and convenient, and are planned as portable outfits. They contemplate that the sterilization of the product will be done in completely sealed tin cans or partially sealed glass jars immersed in boiling water. The only advantage of these outfits over the homemade



FIG. 5.—One of the many steam-pressure canners in which products may be sterilized under pressure ranging from 5 to 30 pounds.

device is that they are more convenient and have all the necessary equipment for operation. Both the homemade and hot-water commercial canners are classed as hot-water bath outfits.

3. *Water-seal outfits* (fig. 4).—These consist of a double-walled bath (a) and a cover (b) which projects down into the water between the outer and inner walls, thus making three tin

or galvanized walls and two water jackets between the sterilizing vat and outer surface of the canner. The chief value of this type of canner is that a higher temperature may be maintained more uniformly than with the hot-water bath outfits and it is more economical of heat, especially in the canning of vegetables or meats, where high temperatures are necessary for complete sterilization.

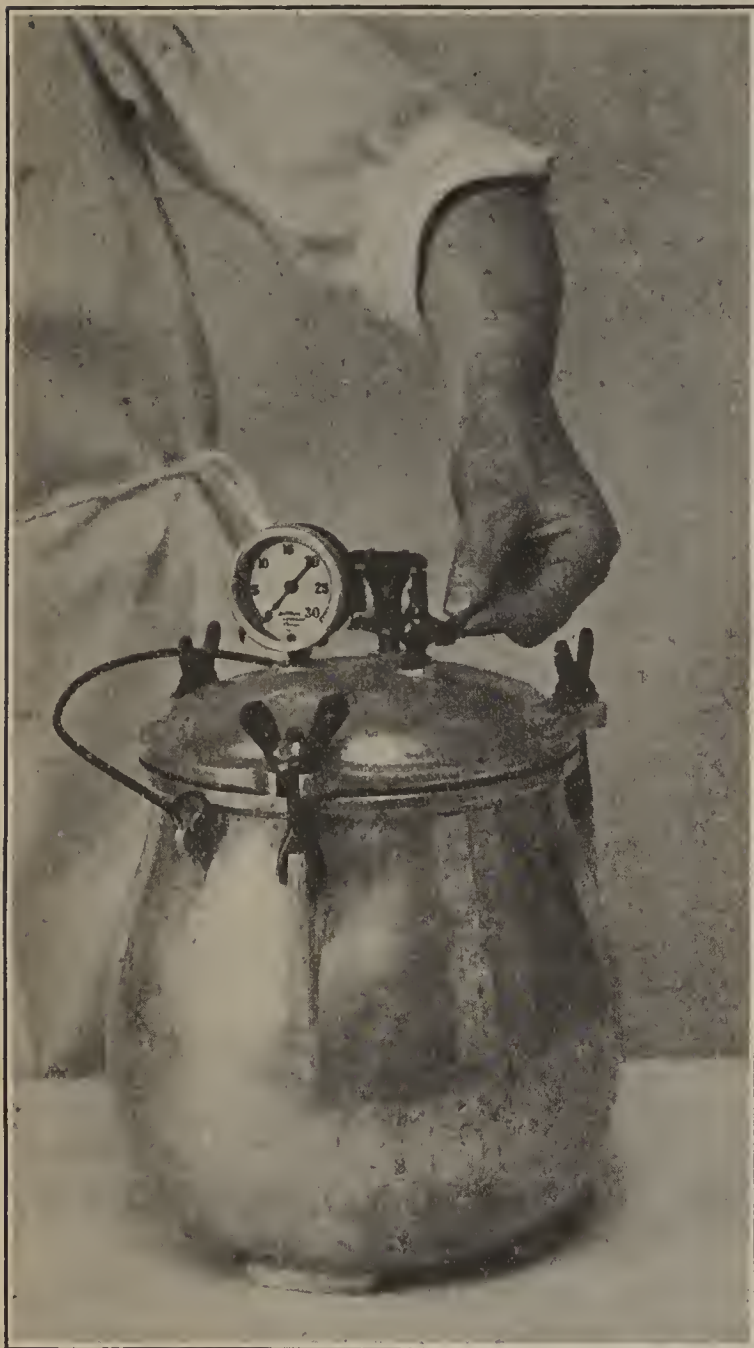


FIG. 6.—Aluminum pressure type of canner, used for both canning and cooking purposes. It is handled on the same basis as all pressure outfits and carries the same pressure values.

4. *Steam-pressure outfits* (fig. 5).—Canners of this type are made to carry from 5 to 30 pounds of steam pressure and are equipped with a steam-tight sterilizer, lifting crate, thermometer or pressure gauge, safety valve, and steam petcock. The pressure canner may be easily regulated so as to maintain different temperatures and thus adapt it to various vegetables and food products.

5. *Aluminum pressure cooker* (fig. 6).—This is a combination outfit for general cooking purposes which is also used for home canning of fruits, vegetables, and meats. It may be used for canning during the canning season and as a cooker during the remainder of the year. As a type, pressure canners are light in construction and economical of heat. They are made entirely of aluminum and will carry as high as 30 pounds steam pressure. They are equipped with a steam-pressure gauge, safety valve, and petcock, as in other steam-pressure outfits made of steel or heavy tinplate.

NOTE.—The time schedule for sterilization in all recipes is made to accommodate the five distinct types of home canners. The homemade and hot-water commercial outfits are classed under the head of "hot-water bath outfits." The other three are classed in the order given above and under the same names, thus making four classes with different time requirements.

TEMPERATURE AT WHICH WATER BOILS AT DIFFERENT ALTITUDES.

Water boils at sea level at 212° F. As the altitude increases, the boiling temperature gradually decreases. The following table is intended as a guide to determine the increase of time required for the sterilization of foodstuffs in the canning process at various altitudes:

Boiling point of water at different altitudes.

Elevation above sea level.	Temperature.	Elevation above sea level.	Temperature.	Elevation above sea level.	Temperature.
<i>Feet.</i>	<i>° F.</i>	<i>Feet.</i>	<i>° F.</i>	<i>Feet.</i>	<i>° F.</i>
500	211	3,000	206	6,000	201
1,000	210	4,000	204+	7,000	199
2,000	208	5,000	202+		

The time requirements given in these instructions are based upon the first altitude given, viz, 500 feet above sea level. For every 1,000 feet increase over this altitude, add 10 per cent to the time requirements given in the recipes or time schedule for the canning of all kinds of fruits, vegetables, greens, and meats. Variations from this schedule will be necessitated by extreme variations in the condition of the products to be canned.

CONTAINERS.

GLASS JARS.

It is generally conceded that glass jars are the most desirable and economical in canning for home use, as they can be used from year to year, or indefinitely by simply replacing the rubbers and tops each year. Practically all of the various types of glass jars available on the market can be successfully used in the canning of fruits, vegetables, and meats by the cold-pack method outlined in this circular.

In the handling of glass-top jars with top and clamp springs (fig. 7) it is important to remember that the rubber, cap, and top spring are put in place and the lower clamp spring is left up during the entire period of sterilization and then lowered and completely closed after sterilization.

In handling the screw-top jar it is important to remember that after the rubber

and top are put in place, the top should be turned until it touches the rubber, sealing the jar partially, but not so closely as to prevent the escape of expanded air.



FIG. 7.—Carrots, whole and cut into convenient sections, canned in glass-top jars.

TIN CANS.

When the canning work has developed to such an extent that a considerable portion of the products will need to be sold on the general market and in competition with commercially canned food products, tin cans are considered most practical because of their convenience in storage, handling, and shipment.

In canning vegetables and meats, it is desirable to use the enameled or lacquered cans. This, however, is not necessary for all products, and especially fruits, when the work is carefully supervised, the blanching and cold dipping properly done, and the general rules for handling the products are closely followed.

For further information on the use of tin cans, ask for United States Department of Agriculture, Office of Extension Work, North and West, Form NR-22, on capping and soldering cans.

MAKING OF BRINES AND SIRUPS.

BRINES.

The following table shows the proportions of salt and water required to make brines of given percentage strengths:

Table for making brines.

Strength of brine.		Salt necessary.			Water necessary.			Strength of brine.		Salt necessary.			Water necessary.		
Per cent.		Pounds.	Gallons.	Quarts.	Pints.			Per cent.		Pounds.	Gallons.	Quarts.	Pints.		
1		1	12	1	1	10		10		10	11	1		0	
2		2	12	1	0	12		12		12	11	0		0	
3		3	12	0	1	15		15		15	10	2		1	
6		6	11	3	0	18		18		18	10	1		0	
8		8	11	2	0	24		24		24	9	2		0	

SUGAR SIRUPS.

Sugar sirups are made by boiling sugar and water together. By means of the following table club members may, under competent instruction, prepare sirup of any desired density, provided a suitable density device is available. No allowance has been made for evaporation.

Table for making sirups.

Density of sirup.		Sugar required.		Water required.		Density of sirup.		Sugar required.		Water required.	
Per cent.		Pounds.		Quarts.		Per cent.		Pounds.		Quarts.	
12		1½		5½		35		7		6½	
15		3		8½		40		2		1½	
18		4½		10½		50		2		1	
24		6		9½		60		3		1	
28		7		9		64		16		4½	

DESCRIPTION AND USE OF SIRUPS OF DIFFERENT DENSITIES.

A formula much used in the West for sirup is 3 quarts of sugar to 2 quarts of water, boiled to a thin, medium-thin, medium-thick, or thick sirup. The formula, sometimes called the Eastern formula, is 3 quarts of water to 2 quarts of sugar, boiled to a thin, medium-thin, medium-thick, or thick sirup. The Western formula, viz, 3 quarts of sugar to 2 quarts of water, may be used in canning all kinds of fruits delicate in flavor and texture and when sugar is low or reasonable in price. When sugar is high in price and the character of the fruit is such that less sugar is required the Eastern formula, viz, 3 quarts of water to 2 quarts of sugar, can be used.

All fruits can be successfully canned by the cold-pack method for future use for jelly making, pie filling, salad purposes, etc., without the use of sugar by simply adding hot water. It has also been found practicable with certain vegetables to substitute sugar for salt in the canning process, seasoning to taste when serving on the table.

Sirups of the approximate densities desired may be easily made by club members without regard to the table of sirup densities given above, and without the use of an instrument for determining density by keeping in mind that—

Thin sirup is sugar and water boiled sufficiently to dissolve all of the sugar, but not sticky. Such sirup has a density of from 12 to 20 per cent.

Medium-thin sirup is that which has begun to thicken and becomes sticky when cooled on the finger tip or spoon (density of from 20 to 40 per cent).

Medium-thick sirup is that which has thickened enough to roll or pile up over the edge of the spoon when one tries to pour it out (density of from 40 to 50 per cent).

Thick sirup is that which has become so thick that it is difficult to pour out of a spoon or container, but is not sugared (density from 50 to 64 per cent).

Thin sirups are used for all sweet fruits that are not too delicate in texture and color, such as cherries, peaches, apples, etc. *Medium-thin sirups* are used in the canning of the medium-sweet fruits, such as blackberries, currants, dewberries, huckleberries, raspberries, etc. *Medium-thick sirups* are used in the canning of all sour fruits, such as gooseberries, apricots, sour apples, etc., and delicately colored fruits, such as strawberries and red raspberries. *Thick sirup* is used in preserving and making all kinds of sun-cooked preserves.

WEIGHTS OF CANS AND CASES.

- 1,000 No. 2 empty tin cans will weigh 212 pounds.
- 1,000 No. 3 empty tin cans will weigh 310 pounds.
- 1 case (wood) for 24 empty No. 2 tin cans will weigh 13 pounds.
- 1 case (wood) for 24 empty No. 3 tin cans will weigh 17 pounds.

NUMBER OF CANS THAT CAN BE FILLED PER BUSHEL OF VARIOUS FRUITS AND VEGETABLES.

The following table shows the number of cans that can be filled per bushel of various fruits and vegetables:

Cans per bushel of various fruits and vegetables.

Product (1 bushel).	No. 2 cans (pints).	No. 3 cans (quarts).	Product (1 bushel).	No. 2 cans (pints).	No. 3 cans (quarts).
Windfall apples	30	20	Tomatoes.....	22	15
Standard peaches	25	18	Shelled lima beans.....	50	30
Pears	45	30	String beans.....	30	20
Plums	45	30	Sweet corn.....	45	25
Blackberries	50	30	Shelled peas.....	16	10
Windfall oranges (sliced)	22	15	Sweet potatoes.....	30	20
Windfall oranges (whole).....	35	22			

IMPORTANT CANNING SUGGESTIONS.

FACTS FOR HOME CANNING.

Do not combine two recipes or two sets of instructions in canning. To do so means to fail.

Remember that adequate heat, plenty of clean water, and complete sterilization are absolutely necessary.

The cold-pack method of canning does not mean that the canning is done without heat, but simply means that the final sterilization is done after the jar or can has been completely filled, the rubber and cap put in place, or the tin can completely sealed.

When using glass jars always utilize the jars on hand, but when it is necessary to buy new jars, buy the best. They are the cheapest in the long run. No glass jar with metal or rubber in direct contact with the food product is desirable unless the cap is enameled, lacquered, or vulcanized. Glass jars should be thoroughly cleaned and should be taken directly from hot water to be filled.

In coring, peeling, and slicing apples, drop the apple product into a vessel containing cold, slightly salted water, in order to keep it from discoloring before packing.

Canned products in glass jars if exposed to light will bleach, fade, and sometimes deteriorate in food value, hence the necessity of wrapping in paper.

If vegetables and greens are blanched in a steamer and then plunged into cold water, it is perfectly safe to use tin cans; however, enameled or lacquered cans are always the safest.

Do not can rhubarb in tin cans unless at least a 35 per cent density sirup and enameled cans are used.

Products canned in tin should be emptied into glass, porcelain, china, or stoneware as soon as the can is opened.

Pack the jars and tin cans thoroughly, but avoid the overpacking of tin cans with products such as corn, peas, and lima beans, as all of these expand somewhat during sterilization.

Avoid using too much salt in the canning of vegetables, greens, tomatoes, and sweet corn. A little sugar added before sterilization will improve the product and sometimes shorten the time required for processing.

Avoid destroying the vegetable or volatile oils in products such as greens, cabbage, brussels sprouts, and cauliflower when canning, but be sure to eliminate the excessive acids. This is done by blanching the product in a steamer or large dishpan (over a false bottom), with just a little water beneath the greens.

In canning windfall apples whole, sliced, or quartered remember that they must be sterilized enough to keep, but avoid overcooking, which reduces the product to apple sauce or discolors the pulp.

An adequate supply of convenient and efficient canning equipment is important to success.

In using steam-pressure outfits, remember that too much pressure injures the quality of all food products.

Begin the canning work with a small quantity of one product the first day. Take time to do the work well, then test the products before canning a large quantity.

Standardize the products, and if they are to be marketed, protect the standard and the trade-mark faithfully from year to year, through a uniform and reliable product. All canned goods offered for sale should be carefully labeled in accordance with the requirements of State and Federal food laws.

In many instances it is important to can with a homemade outfit first, in order later to be in better position to determine what kind of outfit best meets individual needs.

Business organization and management is nowhere more important than in canning operations. The proper placing of tables with relation to canner, water, fuel, and supply of vegetables and fruits, the arrangement of utensils, and the system with which the canning work is executed are all essential matters (see fig. 1, p. 1).

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